

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A semiconductor device comprising:

a semiconductor substrate;

an active element structure formed on the semiconductor substrate, and having a connection region formed in the surface of the semiconductor substrate;

a first insulating film provided on the semiconductor substrate;

a contact hole extending from a surface of the first insulating film to the connection region;

a contact plug provided in the contact hole; and

a buried conductive film filled in a clearance formed in the contact plug, consisting of a material different from the contact plug, ~~and~~ having a continuous surface without forming a step with the surface of the contact plug, and having a first width in the surface of the buried conductive film and a second width larger than the first width in a deeper position than the surface of the buried conductive film.

2. (Original) The device according to claim 1, further comprising:

a barrier metal provided in an interconnect trench formed on the contact plug and the buried conductive film, and having a bottom surface common to the upper surface of the contact plug and the buried conductive film; and

an interconnect layer provided in the interconnect trench, and consisting of a conductive material.

3. (Original) The device according to claim 1, further comprising:

a first intervention conductive film interposed between the inner surface of the contact hole and the contact plug.

4. (Original) The device according to claim 3, wherein the buried conductive film and the first intervention conductive film consist of substantially the same material.

5. (Currently Amended) The device according to claim 4, wherein the buried conductive film and the first intervention conductive film consist substantially of a material selected from the group consisting of TiN and TiSiN ~~or a combination thereof~~.

6. (Currently Amended) The device according to claim 3, wherein  
the first intervention conductive film consists substantially of a material selected from the group consisting of Ti, TiN and TiSiN ~~or a stacked film containing a combination thereof~~,  
and

the buried conductive film consists substantially of a material selected from the group consisting of TiN, TiSiN, Ta and TaN ~~or a stacked film containing a combination thereof~~.

7. (Original) The device according to claim 2, wherein a film thickness of the first intervention conductive film is equal to or less than 10% of the width of cross section of the interconnect trench.

8. (Original) The device according to claim 1, wherein the active element structure includes a transistor.

9. (Original) The device according to claim 1, wherein the contact plug consists substantially of W.

10. (Withdrawn) A semiconductor device comprising:

a semiconductor substrate;

an active element structure formed on the semiconductor substrate, and having a connection region formed in the surface of the semiconductor substrate;

a first insulating film provided on the semiconductor substrate;

a contact hole extending from a surface of the first insulating film to the connection region;

a first intervention conductive film provided on the inner surface of the contact plug;

a second intervention conductive film provided on the first intervention conductive film, having a film thickness of 10 nm or less, and consisting of a material different from the first intervention conductive film; and

a contact plug consisting substantially of Cu filled in the contact hole.

11. (Withdrawn) The device according to claim 10, further comprising:

an interconnect trench formed in a second insulating film on the first insulating film and connected with the contact hole, and wherein

the first and second intervention conductive films extend from the inner surface of the contact hole to that of the interconnect trench,

the interconnect trench is filled with the same material as the contact plug.

12. (Withdrawn) The device according to claim 10, wherein the first intervention conductive film consists substantially of a material selected from the group consisting of Ti, TiN and TiSiN or a stacked film containing a combination thereof.

13. (Withdrawn) The device according to claim 10, wherein the second intervention conductive film consists substantially of a material selected from the group consisting of W, WN and WSiN or a stacked film containing a combination thereof.

14. (Withdrawn) A method of manufacturing a semiconductor device, comprising:  
forming an active element structure having a connection region on a semiconductor substrate, the connection region formed in a surface of the semiconductor substrate;

forming a first insulating film on the semiconductor substrate, the insulating film having a contact hole extending from a surface of the first insulating film to the connection region;

filling the contact hole with a first conductive material film; and

filling a clearance that is formed in the contact hole in the process of filling the first conductive material film with a second conductive material film to have a continuous surface without forming a step with the surface of the first conductive material film, the second conductive material film different from the first conductive material film.

15. (Withdrawn) The method according to claim 14, further comprising:

forming a third conductive material film extending along the inner surface of the contact hole and the upper surface of the first insulating film after forming the first insulating film.

16. (Withdrawn) The method according to claim 15, wherein filling the second conductive material film includes

forming the second conductive material film in the clearance and on the third conductive material film on the first insulating film,

planarizing the second conductive material film and the third conductive material film so that the third conductive material film on the first insulating film and the second conductive material film on the third conductive material film on the first insulating film are removed.

17. (Withdrawn) A method of manufacturing a semiconductor device, comprising:

forming an active element structure having a connection region on the semiconductor substrate, the connection region formed in a surface of the semiconductor substrate;

forming a first insulating film on the semiconductor substrate, the first insulating film having an interconnect hole extending from a surface of the first insulating film to the connection region;

forming a first intervention conductive film on the inner surface of the interconnect hole;

forming a second intervention conductive film on the first intervention conductive film, the second intervention conductive film having a film thickness of 10 nm or less and consisting of a material different from the first intervention conductive film; and

filling the interconnect hole with a film consisting substantially of Cu.

18. (Withdrawn) The method according to claim 17, wherein the interconnect hole includes a contact hole.

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19. (Withdrawn) The method according to claim 17, wherein the interconnect hole includes a contact hole and an interconnect trench connected to the contact hole on the contact hole.